

Automotion produce a wide range of fasteners designed for application where it is important that fasteners are not separated from equipment (e.g. cover panels etc). This is now important to ensure that equipment complies with Machinery Directive 200642/EC - requiring that fasteners remain attached to fixed guards or equipment when guards are removed.






Our captive panel screws are manufactured mainly from stainless steel (A2, AISI 303 grade), but they can also be produced in stainless steel (A4, AISI 316), aluminium, brass or zinc-plated steel.

Many finishes can be applied - black-oxide finish, anodizing etc.

The main options are as follows:

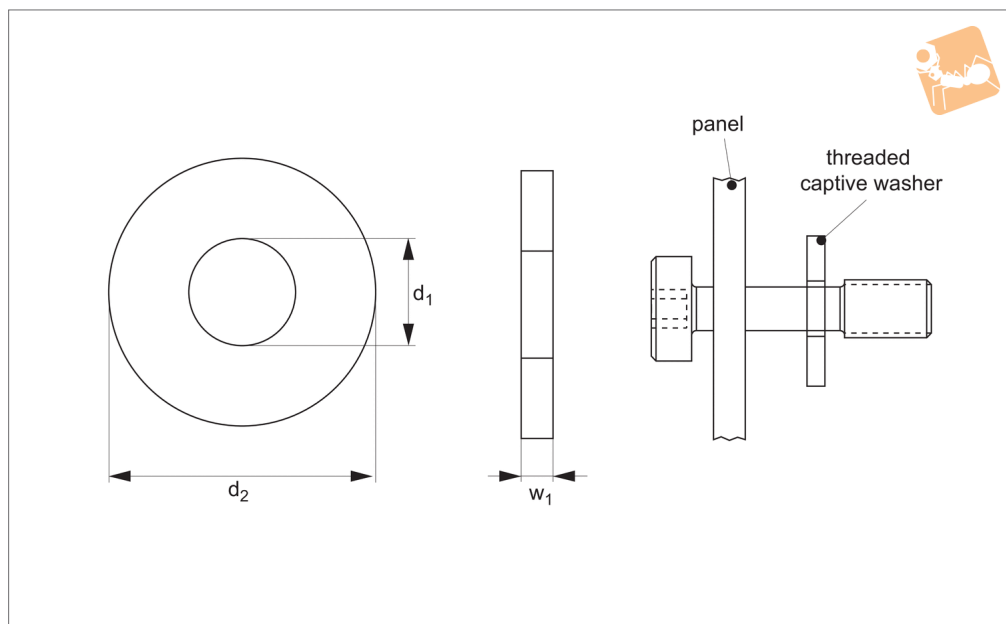
Finish	Notes
Black Chrome (MIL-C-1458B)	Black chrome is a hard, non-reflective coating which is resistant to abrasion, heat and corrosion. The black chrome surface is a dull, dark grey and may be waxed or oiled to darken surface.
Black Oxide Coating (MIL-C-13924B)	Black oxide is a uniform black coating for ferrous metals. Generally it is considered a decorative coating and provides only very limited corrosion protection under mild corrosion conditions.
Cadmium	Cadmium is a bright, silvery white plating. Supplementary treatments for Type II can be golden, iridescent, amber, black or olive drab.
Passivate (QQ-P-35/MIL S-500SC)	Passivation is a process designed to remove foreign metals from the surface of stainless and corrosion resistant steels.
Phosphate Coating Light (TT-C-00490B)	Phosphate coating is a light coating for use as a base paint.
Gold (MIL-G-45204B)	Yellow to orange colour depending on proprietary process used. Will range from matt to bright finish depending on base metal. Good corrosion resistance and high tarnish resistance.
Nickel (QQ-N-290A)	Nickel is a corrosion protective plating for steel, zinc and zinc alloys as well as copper and copper alloys.
Zinc (QQ-Z-325C)	The primary use of chromate finishes on zinc is to retard or prevent formation of white corrosion products on zinc surfaces.

The available head sockets include:

Schematic	Drive Types	Uses
	Hexagonal Recess	Ideal for precision assembly. Most recommended where less surface area is available.
	Crosshead (Phillips®)	Provides good control in driving. Always use a driver bit of the proper size which is in good condition.
	Star Head (Torx®)	Positive-engaging, fast-locating method which transmits drive torque with less required downward pressure. Good fastening appearance.
	Slotted	Accepts standard blade screwdriver. Requires less downward pressure to drive parts than those with recessed openings. Use a proper fitting blade to minimize slippage.
	Security	These screws are impossible to remove without the special matching screw driver.



P0168



Material

Stainless steel (AISI 303, 1.4305 and AISI 316, 1.440), steel (zinc-plated or black-oxide) and titanium (grade 2 and grade 5).

Technical Notes

Captive washers have a very shallow thread on the i/d.

This enables them to be screwed on, and once past the threads they do not separate from the captive screw or bolt.

Tips

Captive washers are primarily used to retain captive screws in panels which have

unthreaded holes. The panel (onto which the screw needs to be retained) is placed onto the captive screw, the threaded washer is then threaded onto the screw, past the threaded section and the screw is therefore captive to the panel.

Order No.	d ₁	w ₁ ±0.05	d ₂	Material
P0168.025-A2	M 2.5	1.0	5	Stainless steel 303
P0168.030-A2	M 3	1.0	6	Stainless steel 303
P0168.035-A2	M 3.5	1.2	8	Stainless steel 303
P0168.040-A2	M 4	1.2	8	Stainless steel 303
P0168.050-A2	M 5	1.5	10	Stainless steel 303
P0168.060-A2	M 6	1.6	12	Stainless steel 303
P0168.080-A2	M 8	2.0	16	Stainless steel 303
P0168.100-A2	M 10	3.0	20	Stainless steel 303
P0168.120-A2	M 12	3.5	24	Stainless steel 303
P0168.160-A2	M 16	4.0	32	Stainless steel 303
P0168.200-A2	M 20	5.0	40	Stainless steel 303
P0168.025-A4	M 2.5	1.0	5	Stainless steel 316
P0168.030-A4	M 3	1.0	6	Stainless steel 316
P0168.035-A4	M 3.5	1.2	8	Stainless steel 316
P0168.040-A4	M 4	1.2	8	Stainless steel 316
P0168.050-A4	M 5	1.5	10	Stainless steel 316
P0168.060-A4	M 6	1.6	12	Stainless steel 316
P0168.080-A4	M 8	2.0	16	Stainless steel 316
P0168.100-A4	M 10	3.0	20	Stainless steel 316
P0168.120-A4	M 12	3.5	24	Stainless steel 316
P0168.160-A4	M 16	4.0	32	Stainless steel 316
P0168.200-A4	M 20	5.0	40	Stainless steel 316
P0168.025-B2	M 2.5	1.0	5	Blackened stainless 303
P0168.030-B2	M 3	1.0	6	Blackened stainless 303
P0168.035-B2	M 3.5	1.2	8	Blackened stainless 303
P0168.040-B2	M 4	1.2	8	Blackened stainless 303
P0168.050-B2	M 5	1.5	10	Blackened stainless 303
P0168.060-B2	M 6	1.6	12	Blackened stainless 303
P0168.080-B2	M 8	2.0	16	Blackened stainless 303
P0168.100-B2	M 10	3.0	20	Blackened stainless 303



Threaded Captive Washers for captive screws

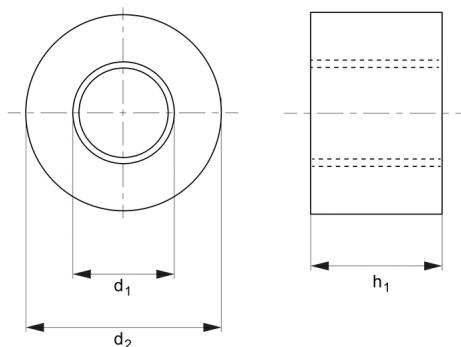
Captive Screws



Order No.	d ₁	w ₁ ±0.05	d ₂	Material
P0168.120-B2	M 12	3.5	24	Blackened stainless 303
P0168.160-B2	M 16	4.0	32	Blackened stainless 303
P0168.200-B2	M 20	5.0	40	Blackened stainless 303
P0168.025-B4	M 2.5	1.0	5	Blackened stainless 316
P0168.030-B4	M 3	1.0	6	Blackened stainless 316
P0168.035-B4	M 3.5	1.2	8	Blackened stainless 316
P0168.040-B4	M 4	1.2	8	Blackened stainless 316
P0168.050-B4	M 5	1.5	10	Blackened stainless 316
P0168.060-B4	M 6	1.6	12	Blackened stainless 316
P0168.080-B4	M 8	2.0	16	Blackened stainless 316
P0168.100-B4	M 10	3.0	20	Blackened stainless 316
P0168.120-B4	M 12	3.5	24	Blackened stainless 316
P0168.160-B4	M 16	4.0	32	Blackened stainless 316
P0168.200-B4	M 20	5.0	40	Blackened stainless 316
P0168.025-ZP	M 2.5	1.0	5	Zinc-plated steel
P0168.030-ZP	M 3	1.0	6	Zinc-plated steel
P0168.035-ZP	M 3.5	1.2	8	Zinc-plated steel
P0168.040-ZP	M 4	1.2	8	Zinc-plated steel
P0168.050-ZP	M 5	1.5	10	Zinc-plated steel
P0168.060-ZP	M 6	1.6	12	Zinc-plated steel
P0168.080-ZP	M 8	2.0	16	Zinc-plated steel
P0168.100-ZP	M 10	3.0	20	Zinc-plated steel
P0168.120-ZP	M 12	3.5	24	Zinc-plated steel
P0168.160-ZP	M 16	4.0	32	Zinc-plated steel
P0168.200-ZP	M 20	5.0	40	Zinc-plated steel
P0168.025-BL	M 2.5	1.0	5	Blackened steel
P0168.030-BL	M 3	1.0	6	Blackened steel
P0168.035-BL	M 3.5	1.2	8	Blackened steel
P0168.040-BL	M 4	1.2	8	Blackened steel
P0168.050-BL	M 5	1.5	10	Blackened steel
P0168.060-BL	M 6	1.6	12	Blackened steel
P0168.080-BL	M 8	2.0	16	Blackened steel
P0168.100-BL	M 10	3.0	20	Blackened steel
P0168.120-BL	M 12	3.5	24	Blackened steel
P0168.160-BL	M 16	4.0	32	Blackened steel
P0168.200-BL	M 20	5.0	40	Blackened steel
P0168.025-T2	M 2.5	1.0	5	Grade 2 titanium
P0168.030-T2	M 3	1.0	6	Grade 2 titanium
P0168.035-T2	M 3.5	1.2	8	Grade 2 titanium
P0168.040-T2	M 4	1.2	8	Grade 2 titanium
P0168.050-T2	M 5	1.5	10	Grade 2 titanium
P0168.060-T2	M 6	1.6	12	Grade 2 titanium
P0168.080-T2	M 8	2.0	16	Grade 2 titanium
P0168.100-T2	M 10	3.0	20	Grade 2 titanium
P0168.120-T2	M 12	3.5	24	Grade 2 titanium
P0168.160-T2	M 16	4.0	32	Grade 2 titanium
P0168.200-T2	M 20	5.0	40	Grade 2 titanium
P0168.025-T5	M 2.5	1.0	5	Grade 5 titanium
P0168.030-T5	M 3	1.0	6	Grade 5 titanium
P0168.035-T5	M 3.5	1.2	8	Grade 5 titanium
P0168.040-T5	M 4	1.2	8	Grade 5 titanium
P0168.050-T5	M 5	1.5	10	Grade 5 titanium
P0168.060-T5	M 6	1.6	12	Grade 5 titanium
P0168.080-T5	M 8	2.0	16	Grade 5 titanium
P0168.100-T5	M 10	3.0	20	Grade 5 titanium
P0168.120-T5	M 12	3.5	24	Grade 5 titanium
P0168.160-T5	M 16	4.0	32	Grade 5 titanium
P0168.200-T5	M 20	5.0	40	Grade 5 titanium



P0340



Material

Stainless steel (AISI 303, 1.4305).
Available with a grey metallic or matte

black (black oxide coated) finish.

Order No.	Coarse thread d_1	d_2 $+2 -0.2$	h_1 ± 0.1	Material
P0340.020-10-06-A2	M 2	10	6	Stainless steel 303
P0340.025-10-06-A2	M2,5	10	6	Stainless steel 303
P0340.030-10-06-A2	M 3	10	6	Stainless steel 303
P0340.020-10-05-B2	M 2	10	5	Blackened stainless 303
P0340.020-10-06-B2	M 2	10	6	Blackened stainless 303
P0340.020-10-08-B2	M 2	10	8	Blackened stainless 303
P0340.020-10-10-B2	M 2	10	10	Blackened stainless 303
P0340.025-10-05-B2	M2,5	10	5	Blackened stainless 303
P0340.025-10-06-B2	M2,5	10	6	Blackened stainless 303
P0340.025-10-08-B2	M2,5	10	8	Blackened stainless 303
P0340.025-10-10-B2	M2,5	10	10	Blackened stainless 303
P0340.030-10-05-B2	M 3	10	5	Blackened stainless 303
P0340.030-10-06-B2	M 3	10	6	Blackened stainless 303
P0340.030-10-08-B2	M 3	10	8	Blackened stainless 303
P0340.030-10-10-B2	M 3	10	10	Blackened stainless 303
P0340.040-10-05-B2	M 4	10	5	Blackened stainless 303
P0340.040-10-08-B2	M 4	10	8	Blackened stainless 303
P0340.040-10-10-B2	M 4	10	10	Blackened stainless 303
P0340.040-12-05-B2	M 4	12	5	Blackened stainless 303
P0340.040-12-08-B2	M 4	12	8	Blackened stainless 303
P0340.040-12-10-B2	M 4	12	10	Blackened stainless 303
P0340.040-12-15-B2	M 4	12	15	Blackened stainless 303
P0340.050-10-05-B2	M 5	10	5	Blackened stainless 303
P0340.050-10-08-B2	M 5	10	8	Blackened stainless 303
P0340.050-10-10-B2	M 5	10	10	Blackened stainless 303
P0340.050-12-05-B2	M 5	12	5	Blackened stainless 303
P0340.050-12-08-B2	M 5	12	8	Blackened stainless 303
P0340.050-12-10-B2	M 5	12	10	Blackened stainless 303
P0340.050-12-15-B2	M 5	12	15	Blackened stainless 303
P0340.050-16-05-B2	M 5	16	5	Blackened stainless 303
P0340.050-16-08-B2	M 5	16	8	Blackened stainless 303
P0340.050-16-10-B2	M 5	16	10	Blackened stainless 303
P0340.050-16-15-B2	M 5	16	15	Blackened stainless 303
P0340.060-12-05-B2	M 6	12	5	Blackened stainless 303



Threaded Washers

303 stainless



Captive Screws

Order No.	Coarse thread d_1	d_2 $+2 -0.2$	h_1 ± 0.1	Material
P0340.060-12-08-B2	M 6	12	8	Blackened stainless 303
P0340.060-12-10-B2	M 6	12	10	Blackened stainless 303
P0340.060-12-15-B2	M 6	12	15	Blackened stainless 303
P0340.060-16-05-B2	M 6	16	5	Blackened stainless 303
P0340.060-16-08-B2	M 6	16	8	Blackened stainless 303
P0340.060-16-10-B2	M 6	16	10	Blackened stainless 303
P0340.060-16-15-B2	M 6	16	15	Blackened stainless 303
P0340.060-20-08-B2	M 6	20	8	Blackened stainless 303
P0340.060-20-10-B2	M 6	20	10	Blackened stainless 303
P0340.060-20-15-B2	M 6	20	15	Blackened stainless 303
P0340.060-20-20-B2	M 6	20	20	Blackened stainless 303
P0340.080-16-05-B2	M 8	16	5	Blackened stainless 303
P0340.080-16-08-B2	M 8	16	8	Blackened stainless 303
P0340.080-16-10-B2	M 8	16	10	Blackened stainless 303
P0340.080-16-15-B2	M 8	16	15	Blackened stainless 303
P0340.080-16-20-B2	M 8	16	20	Blackened stainless 303
P0340.080-20-08-B2	M 8	20	8	Blackened stainless 303
P0340.080-20-10-B2	M 8	20	10	Blackened stainless 303
P0340.080-20-15-B2	M 8	20	15	Blackened stainless 303
P0340.080-20-20-B2	M 8	20	20	Blackened stainless 303
P0340.020-10-05-A2	M 2	10	5	Stainless steel 303
P0340.020-10-08-A2	M 2	10	8	Stainless steel 303
P0340.020-10-10-A2	M 2	10	10	Stainless steel 303
P0340.025-10-05-A2	M2,5	10	5	Stainless steel 303
P0340.025-10-08-A2	M2,5	10	8	Stainless steel 303
P0340.025-10-10-A2	M2,5	10	10	Stainless steel 303
P0340.030-10-05-A2	M 3	10	5	Stainless steel 303
P0340.030-10-08-A2	M 3	10	8	Stainless steel 303
P0340.030-10-10-A2	M 3	10	10	Stainless steel 303
P0340.040-10-05-A2	M 4	10	5	Stainless steel 303
P0340.040-10-08-A2	M 4	10	8	Stainless steel 303
P0340.040-10-10-A2	M 4	10	10	Stainless steel 303
P0340.040-12-05-A2	M 4	12	5	Stainless steel 303
P0340.040-12-08-A2	M 4	12	8	Stainless steel 303
P0340.040-12-10-A2	M 4	12	10	Stainless steel 303
P0340.040-12-15-A2	M 4	12	15	Stainless steel 303
P0340.050-10-05-A2	M 5	10	5	Stainless steel 303
P0340.050-10-08-A2	M 5	10	8	Stainless steel 303
P0340.050-10-10-A2	M 5	10	10	Stainless steel 303
P0340.050-12-05-A2	M 5	12	5	Stainless steel 303
P0340.050-12-08-A2	M 5	12	8	Stainless steel 303
P0340.050-12-10-A2	M 5	12	10	Stainless steel 303
P0340.050-12-15-A2	M 5	12	15	Stainless steel 303
P0340.050-16-05-A2	M 5	16	5	Stainless steel 303
P0340.050-16-08-A2	M 5	16	8	Stainless steel 303
P0340.050-16-10-A2	M 5	16	10	Stainless steel 303
P0340.050-16-15-A2	M 5	16	15	Stainless steel 303
P0340.060-12-05-A2	M 6	12	5	Stainless steel 303
P0340.060-12-08-A2	M 6	12	8	Stainless steel 303
P0340.060-12-10-A2	M 6	12	10	Stainless steel 303
P0340.060-12-15-A2	M 6	12	15	Stainless steel 303
P0340.060-16-05-A2	M 6	16	5	Stainless steel 303
P0340.060-16-08-A2	M 6	16	8	Stainless steel 303
P0340.060-16-10-A2	M 6	16	10	Stainless steel 303
P0340.060-16-15-A2	M 6	16	15	Stainless steel 303
P0340.060-20-08-A2	M 6	20	8	Stainless steel 303
P0340.060-20-10-A2	M 6	20	10	Stainless steel 303
P0340.060-20-15-A2	M 6	20	15	Stainless steel 303
P0340.060-20-20-A2	M 6	20	20	Stainless steel 303
P0340.080-16-05-A2	M 8	16	5	Stainless steel 303
P0340.080-16-08-A2	M 8	16	8	Stainless steel 303
P0340.080-16-10-A2	M 8	16	10	Stainless steel 303
P0340.080-16-15-A2	M 8	16	15	Stainless steel 303
P0340.080-16-20-A2	M 8	16	20	Stainless steel 303
P0340.080-20-08-A2	M 8	20	8	Stainless steel 303
P0340.080-20-10-A2	M 8	20	10	Stainless steel 303
P0340.080-20-15-A2	M 8	20	15	Stainless steel 303
P0340.080-20-20-A2	M 8	20	20	Stainless steel 303

CAPTIVE SCREWS



Automotion provides a wide range of captive screws to aid customers to comply with the Machinery Directive 2006/42/EC.

In general there is a requirement that fixings for fixed guards shall remain attached to the guard or machinery when the guard is removed. This was implemented mainly to ensure that as far as possible fasteners are not lost when the guard is removed and the guard is therefore re-installed with all required fixings.

A wide range of captive screws and thumb screws are provided...



P0151
Button Head - Hex
Security and Torx Options



P0154
Socket Head - Cap Screw
Security and Torx Options



P0158
Hexagon Head Bolt



P0159
Captive Panel Screw



P0160
Thin Head Thumb Screws



P0161
Thumb Screws

Installation

To work effectively the captive screw when installed needs to have a space or counterbore between the thread and cover at least equal to the length of the thread.

